 HYUNDAI Technical Service Bulletin	GROUP FUEL SYSTEM	NUMBER 19-FL-002H
	DATE MARCH, 2019	MODEL(S) SANTA FE (TM)
SUBJECT: IDLE STOP & GO SYSTEM OPERATION AND BATTERY SENSOR RECALIBRATION PROCEDURE		

Description: This bulletin describes the Santa Fe (TM) Idle Stop and Go (ISG) system operations and battery sensor recalibration procedure. Refer to applicable Work Shop Manual and Owner's Manual for additional information.

Applicable Vehicles: Santa Fe (TM) with Idle Stop and Go (ISG) System

System Operation:

The Idle Stop and Go (ISG) system automatically and temporarily shuts down the engine when vehicle is stopped and idling to improve fuel efficiency and reduce exhaust gas emissions. The ISG system restarts the engine when the brake pedal is released or the accelerator pedal is depressed (if equipped with Auto Hold feature and it is activated).

The ISG system is active whenever ignition is cycled to start the vehicle. Press the ISG OFF button to deactivate the system.



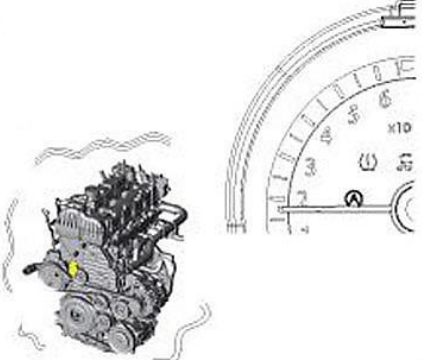


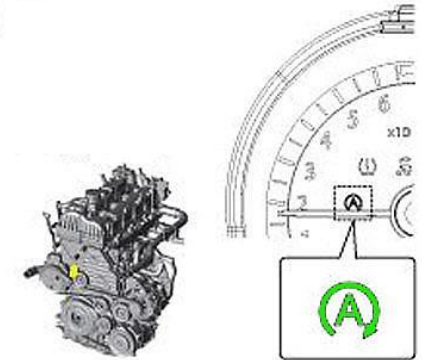


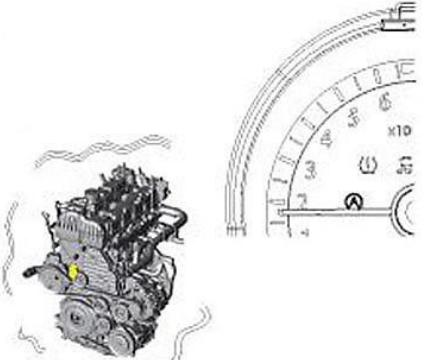
Prerequisites for ISG System Activation:

- The driver's seatbelt is fastened
- The driver's door and the hood are closed
- The brake vacuum pressure is adequate
- The battery is sufficiently charged, State of Charge (SOC) is 70% or above
- The outside temperature is between 14 ~ 95°F (-10 ~ 35° C)
- The engine coolant temperature is over 86°F (30° C)
- The system is not in the diagnostic mode
- There are no related diagnostic trouble codes
- The vehicle is not on a steep slope
- Steering wheel is turned less than 180 degrees
- Shift lever is in DRIVE or NEUTRAL







NOTICE

- **The ISG system is not activated when the prerequisites to activate the ISG system are unsatisfied. In this case, the orange color Auto Stop symbol is illuminated in the instrument cluster when the vehicle comes to a stop and the "ISG OFF" button indicator in the center console illuminates or flashes depending upon the ISG system version.**
- **Vehicle speed must reach at least 5 MPH in order for the ISG to activate again after the previous stop.**

Illustrations below demonstrate ISG system operations.

<p>1. Vehicle is moving.</p>	<p>2. Shift lever is in DRIVE. Brake pedal is released.</p>	<p>3. Engine is running.</p>
		
<p>4. Driver brakes until the vehicle is stationary.</p>	<p>5. Shift lever is in DRIVE. Brake pedal is pressed.</p>	<p>6. Engine stops running. Green color Auto Stop symbol illuminates in the instrument cluster.</p>
		
<p>7. Driver wants to continue the journey.</p>	<p>8. Shift lever is in DRIVE. Brake pedal is released.</p>	<p>9. Engine restarts and running. Auto Stop symbol goes out.</p>
		

Auto Stop and Go Illuminations and Conditions

<p>Auto Stop symbol illuminated in green color</p> <ul style="list-style-type: none"> • ISG activated • Engine stopped 	<p>Auto Stop symbol illuminated in yellow color</p> <ul style="list-style-type: none"> • ISG prerequisites unsatisfied • Engine running 	<p>ISG Off button illuminated</p> <ul style="list-style-type: none"> • ISG prerequisites unsatisfied • Idle Stop deactivated • Battery sensor is recalibrating • Engine running 
<p>Auto Stop symbol flashing in green color</p> <ul style="list-style-type: none"> • ISG automatically restarted • Engine running 	<p>Auto Stop symbol flashing in yellow color</p> <ul style="list-style-type: none"> • ISG system malfunction • Engine running 	<p>ISG Off button flashing</p> <ul style="list-style-type: none"> • Battery cable or sensor was recently disconnected • Battery sensor is recalibrating • Engine stopped 

Situations Engine May Automatically Restart:

- The climate control system blower fan speed is set above 6th position with air condition ON
- A certain period of time has elapsed with the air condition ON
- The defroster is activated
- The brake vacuum pressure is low
- The battery State of Charge (SOC) is below 70% threshold limit or battery is weak
- The vehicle is shifted to PARK or REVERSE when the brake pedal is depressed or the Auto Hold is activated
- The driver door is opened or driver seat belt is unfastened when the brake pedal is depressed or Auto Hold is activated
- The Electronic Parking Brake (EPB) is pressed when the Auto Hold is activated (if EPB is equipped)

! WARNING

- When the engine is in auto stop mode, the engine may restart on its own.
- Never perform any work to the engine with the ignition in the “ON” or “ACC” position as the engine may start without warning.
- Before leaving the vehicle or checking the engine compartment, stop the engine by pushing/turning the ignition switch to the OFF position and remove the key(s) from the vehicle.

Battery Sensor

- Battery sensor which is mounted on battery negative (-) terminal transmits battery voltage, current, and temperature information to Engine Control Module (ECM).
- ISG system utilizes Battery State of Charge (SOC), Battery State of Health (SOH) and other battery data generated by battery sensor.
- Battery sensor requires approximately 4 hours of continuous connection with a battery to generate stabilized data.
- Perform battery sensor recalibration procedure below after finishing any repair work if battery cable or battery sensor was disconnected from battery or battery was recharged.

Battery Sensor Recalibration Procedure:

- Switch "ON" and "OFF" the ignition one time.
- Park the vehicle for a minimum of 4 hours with the hood and all doors closed.

Battery SOC and SOH data check procedure:**NOTICE**

Perform the procedure only after the battery sensor recalibration procedure had been followed and vehicle had been parked for over 4 hours.

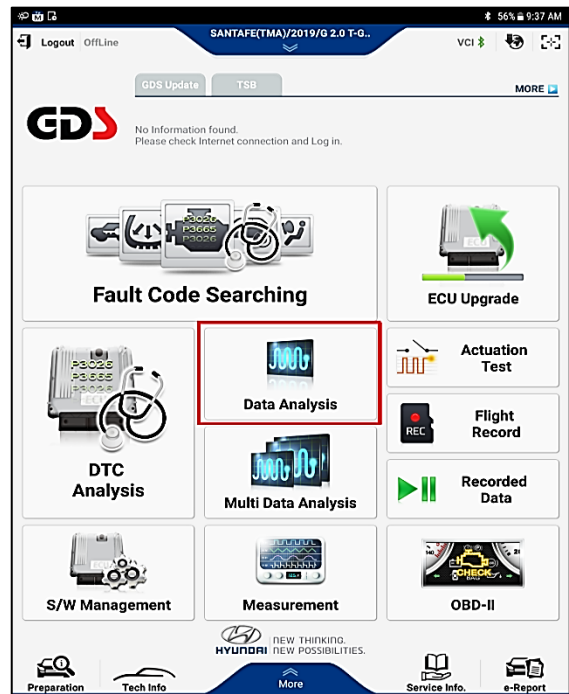
1. Turn the ignition key to the ON position or press the Start-Stop Button two times without depressing the brake pedal. Connect a GDS Mobile VCI-II to the vehicle data link connector.



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2. Select “Data Analysis” within the GDS app.



3. Select “Engine”.



4. Ensure that State of Charge of Battery (SOC) and State of Health of Battery (SOH) displays a percentage value.

Sensor Name(12)	Value	Unit	Link Up
AMS Stop Reason - Blower Max Switch(AMS)	OFF	-	
AMS Stop Reason - Head Lamp(AMS)	ON	-	
AMS Stop Reason - Wiper(AMS)	OFF	-	
Battery Current(AMS)	5.5	A	
Battery Voltage(AMS)	14.4	V	
Battery Temperature(AMS)	37.5	°C	
State of Charge of Battery(AMS)	77	%	
State of Health of Battery(AMS)	81	%	
State of Function of Battery(AMS)	9.4	V	
Desired Alternator Voltage Duty Cycle(AMS)	72.5	%	
Duty Cycle from Alternator PWM Signal(AMS)	72.0	%	
Nominal Capacity(AMS)	80	Ah	

5. If SOC or SOH displays the word “Checking” instead of a percentage value, repeat battery sensor recalibration procedure.

Sensor Name(12)	Value	Unit	Link Up
AMS Stop Reason - Blower Max Switch(AMS)	OFF	-	
AMS Stop Reason - Head Lamp(AMS)	ON	-	
AMS Stop Reason - Wiper(AMS)	OFF	-	
Battery Current(AMS)	5.1	A	
Battery Voltage(AMS)	14.4	V	
Battery Temperature(AMS)	39.0	°C	
State of Charge of Battery(AMS)	Checking	%	
State of Health of Battery(AMS)	Checking	%	
State of Function of Battery(AMS)	12.8	V	
Desired Alternator Voltage Duty Cycle(AMS)	72.5	%	
Duty Cycle from Alternator PWM Signal(AMS)	72.4	%	
Nominal Capacity(AMS)	80	Ah	

6. Verify the ISG system is operational again when SOC, SOH and all the ISG operation prerequisites are satisfied.